Amendments to the Drawings:

In the DRAWINGS Section, please renumber Fig. 7 to Fig. 7b and add Fig. 7a presented in the attached New Sheet.

A new Fig. 7a shows the relation of a switching device's RDS versus gate voltage.

In the DRAWINGS Section, please replace Fig. 5, Fig. 6, Fig. 9, Fig. 10a and Fig. 10b with the attached Replacement Sheets.

To better indicate that the translinear amplifier is imbedded within the circuit to control the switching operation, a frame marked **Switch-Ctrl** in the drawings (Figs. 5, 6, 10a and 10b) now indicates the circuit comprising said translinear amplifier and possibly some glue components around it.

Similar, in Fig. 10a the additional circuits for the signal cut-off functions **CutOffC-Hi** and **CutOffC-Lo** are now marked with additional frames. And in Fig. 10b the temperature compensating circuit **Temp-Comp** is additionally marked.

The common connection to all output reference points of the translinear amplifiers (as of Fig. 6) is now indicated in Fig. 9 as the common output reference level **C-Ref-out**.

Attachment: New Sheet for Fig. 7a

Replacement Sheets for Fig. 5, Fig. 6, Fig. 7b, Fig. 9, Fig. 10a and Fig. 10b.

REMARKS/ARGUMENTS

In response to the subject Office Action, an Amendment to the Specifications, to the Claims and to the Drawings section is herein submitted.

The instant Amendment is a complete replacement for the previously filed Office Action, submitted in response to the office action dated Oct. 20, 2006

Examiner Nguyen is thanked for thoroughly reviewing the above referenced patent application, and for the indication of allowability once various formal matters and informalities are corrected.

Remarks and Arguments on Claim Rejections due to 35 USC §112
as stated in the Office Action, dated Jan. 19, 2007

Reconsideration of the rejection of claims 1-52 as being indefinite is requested, based on the following.

Regarding the rejection, stating: "The Amendment filed on 12-22-06 fails to clarify the 35 U.S.C. 112 2nd problems raised in the final Office Action. Moreover, the amendment even creates more 112, 2nd problem. For example, the newly added

limitations " a multiple of reference level pairs" in claims 1 and 5; "said two circuits" in claim 5 are not seen in the drawings. In claim 17, the Applicant fails to show and to explain what are the "circuit that drive the switching device to a fully on status" and the "circuit that drive the switching device to a fully off status". Therefore, the 35 U.S.C. 112, 2nd rejection remains."

1. The term "a multiple of reference level pairs" has been introduced to clarify that for each capacitor switching stage an input reference level and an output reference level is provided, i.e. for a multiple of capacitor switching stages, a multiple of reference level pairs will be provided. In the instant amendment, the term "a multiple of reference level pairs" is removed again in the specifications and in the claims. To point out the "circuit to individually provide input and output reference levels for each of said capacitor switching stages", drawing Fig. 6 is amended; said drawing also shows the connections of said input and an output reference levels to each capacitor switching stage. The appropriate description is consolidated throughout the document

2. To overcome the stated problems with the "circuit that drive the switching device to a fully on status" and the "circuit that drive the switching device to a fully off status", the previous specification is amended with major changes in the wording. Citations of the referenced patent application are added to the specification. Also Fig. 10a is further amended.

Thorough care is taken to not include by accident any new matter.

As the instant Amendment is a complete replacement for the previously filed Amendment, submitted in response to the office action dated Oct. 20, 2006, Remarks and Arguments therefore continue hereafter with said office action dated Oct. 20, 2006.

Remarks and Arguments on Claim Rejections due to 35 USC §112
as stated in the Office Action, dated Oct. 20, 2006

1. Regarding claim 1, the recitation **"a circuit** to individually provide the threshold levels for each of said capacitor switching stages, building a measure for the input and the output reference levels for each of said translinear amplifiers within said capacitor switching stages; **a circuit** to provide the output reference level for said translinear amplifiers (is claim 10); and a circuit to provide a signal, dependent on the tuning voltage, dedicated for the voltage controlled capacitance change, to the inputs of all of said capacitor switching stages" is indefinite, because it is confusing for several reasons:

The structure of the claims 1, 17, 26, 33, 43, and 74, are now further amended. It is now made clear, that the circuit to control the switching operation (also called hereafter the switch control circuit) comprises a translinear amplifier as its key component. Drawings Fig. 5, Fig. 6, Fig. 10a and Fig. 10b show an additional frame, clearly marking said switch control circuit **Switch-Ctrl** and its embedded translinear amplifier. The additional circuits to drive said switching device to a fully on or off state (claim 17) and a circuit to compensate the temperature deviation of said switching device (claim 26) are explicitly shown in Fig. 10a and Fig. 10b. Further the nomenclature of threshold levels and

reference levels is tightened. Also distinguishing clearly between input reference levels and output reference levels in the specifications and in the claims should significantly improve clarity of definitions. Appropriate changes are made to the specification. Consequently claims 33, 43 and 47 are restructured in the same way.

A major change in the specifications reads as follows:

A single capacitor switching stage, as shown in **Fig. 5**, contains a circuit to control the switching operation **Switch-Ctrl** (also called hereafter the switch control circuit), a switching device **SW** and a small capacitor **Cap**. Said circuit to control the switching operation receives a signal, dependent on the tuning voltage **Vtune**, an input reference signal **Ref-in-5** and an output reference signal **Ref-out-5**, where said input reference signal **Ref-in-5** is then provided to the input reference point **Vinn-5** and said output reference signal **Ref-out-5** is then provided to the output reference point **Voutn-5**. The translinear amplifier in **Fig. 5**, imbedded within said circuit to control the switching operation **Switch-Ctrl**, possibly together with some electronic glue components, compares the differential voltage at its inputs **Vinp-5** and **Vinn-5** and, through various current mirroring techniques~~,~~ and provides the same differential voltage at its outputs **Voutp-5** and **Voutn-5**; i.e. the output difference of said amplifier strictly follows the difference at said amplifier inputs, independent of the absolute voltage level at the outputs. Said switch control circuit **Switch-Ctrl** then provides a switch control signal **Vsw**, based on said~~The~~ translinear amplifier's output signal to said switching device **SW**. Switch control signal **Vsw** then drives ~~said~~ a current switching device **N1-5** with the gate voltage **Vg-5** to switch on said individual small capacitor **Cap-5** in the proposed steady ramp-up/ramp-down manner. Switching in said steady ramp-up/ramp-down manner results in the desired variable capacitance **Var-Cap-5** of said single capacitor switching stage.

Claim 1 is now amended to:

Claim 1.: A circuit to control the capacitance of a variable capacitor in a strictly linear mode through a steady tuning voltage and to achieve a high Q-factor at the same time; comprising:

a set of individual small capacitors;

a set of capacitor switching stages, each stage comprising;

a switching device, allowing a steady ramp-up/ramp-down phase between the points of being fully switched on and fully switched off, and where said switching device is connected in series with one of said capacitors, to connect a multiple of said capacitors in parallel;

a circuit to control the switching operation of said switching device in a steady ramp-up/ramp-down manner between the points of being fully switched on and fully switched off, comprising:

a translinear amplifiers to produce ~~the~~ a ramp-up/ramp-down signal for ~~each of~~ said ~~set of~~ switching devices, where said translinear amplifier is implemented within said circuit to control the switching operation;

a circuit to individually provide ~~the threshold~~input and output reference levels for each of said capacitor switching stages, building ~~a measure for~~ the input reference levels and the output reference levels for each of said translinear amplifiers, comprised within said capacitor switching stages;

~~a circuit to provide the output reference level for said translinear amplifiers; and~~

an ~~circuit to provide a~~ input signal, dependent on the tuning voltage, dedicated for the voltage controlled capacitance change, provided to the inputs of all of said capacitor switching stages.

2. Regarding claim 1 being unclear "if the signal (Vref) in figure 9 of the present application is the input signal or the output signal" and the recitation "the output reference levels lacking antecedent basis", is now corrected. Drawing Fig. 9 is amended to show a single signal **C-Ref-out** as the common reference signal, being connected in common to all output reference points of the translinear amplifiers. The specifications are amended accordingly.

3. Regarding claim 17, the recitation "a circuit to drive said switching device to a fully on status" on line 22 and "a circuit to drive said switching device to a fully off status" on line 27 are indefinite because it is not clear as to these two " circuit" is the same or different than the "a translinear amplifiers" on line 18. Drawing Fig. 10a and the specifications are amended to show these three circuits as three separate circuits, operating in parallel according to their specific function and their outputs being connected (dot or connection)

to a single line, where the cut-off circuits override the translinear amplifier's control operation when said steady ramp-up/ramp-down area is exceeded.

Additional descriptions are added, first explaining the relation of the "Steady Transition Area" of a switching device, the end-point of the steady transition area and the areas "Outside the Steady Transition Area". For the same purpose, a new Fig. 7a is presented, showing the relation of a switching device's resistance RDS versus its gate voltage and therein showing the Steady Transition Area.

The amended description reads as follows (text deleted from the original not shown here):

The linear operation of real switching devices is naturally limited, for example because it is reaching a switching transistor's saturation or because the resistance already reached the maximum achievable value and where, for example, a further change of gate voltage **Vg** would not create further increase of a switching transistor's resistance RDS. As explained before, the area of linear operation is called the "steady transition area", consequently the areas beyond the linear operating area are named here as the areas "outside the steady transition area". These are the areas where further change of the switch control signal **Vsw** would first cause only a non-linear change of resistance RDS and would finally have no more effect. In **Fig. 7a** the linear operating area and its end-points is shown: the **Steady Transition Area**, the end-point of the steady transition area at the low (RDS) resistance side of said switching device, marked **Ep-Lo**, and the end-point of the steady transition area at the high (RDS) resistance side of said switching device, marked **EP-Hi**. The switching device to switch on the capacitor is used for the presented patent application as a "switching device with a well controllable steady ramp-up/ramp-down area "; said device is in many cases shortly referenced in the instant document as "switching device".

Further, the specification is amended with a major change to the description of the two Cut-off-Circuit. The new explanations read as follows (text deleted from the original not shown here):

Another key point of the invention is the implementation of signal cutoff functions at both ends of the steady ramp-up/ramp-down area. At the end-points of said steady transition area,

where further linear change of the switch control signal **Vsw** would have nearly no further effect on the switching device to change its resistance RDS. After passing said end-points of said steady transition area, it would be desirable to not continue with a linear signal to control the switching device, but to apply a very steep signal change, thus driving the switching device very sharply into its minimum achievable resistance (RDSon as low as possible) or into its maximum achievable resistance (RDSoff as high as possible). Two additional circuits, **CutOffC-Lo** and **CutOffC-Hi** in **Fig. 10a**, perform said steep signal change, where one of said two additional circuits takes over full control of the switch control signal **Vsw,** i.e. they "override" the normal control signal, as provided by the translinear amplifier itself. The end-points of said steady transition area, where the steep signal change should appear are called the cut-off edges. Which of said two additional circuits is activated, depends on the switch status: to drive the switching device into minimum achievable resistance (RDSon as low as possible), the additional cut-off circuit **CutOffC-Lo** will be activated, or to drive the switching device into its maximum achievable resistance (RDSoff as high as possible) the additional cut-off circuit **CutOffC-HI** will be activated

Fig. 7b of the instant document visualizes the idea of sharply cutting off said signal controlling the switching device as soon as a changing Gate Control Voltage **Vg** leaves the desired steady transition area **Steady ramp-up/ramp-down Area** at the cutoff edges **CutOff Lo** and **CutOff Hi**. For example, at the two desired points, beyond the 98 % on-point, said signal **Vg** controlling the switching device is rised sharply and below the 2 % on-point said signal **Vg** controlling the switching device is driven to rapidly switch-off. The area outside the desired steady transition area at the low (RDSon) resistance side of said switching device is marked **Outside Lo,** and the area outside the desired steady transition area at the high (RDSoff) resistance side of said switching device is marked **Outside Hi**. The end-points **Ep-Lo** and **Ep-Hi** in **Fig. 7a** correspond with the cutoff edges marked with **CutOff Lo** and **CutOff Hi**

A possible solution for said signal cutoff functions could be to implement said signal cutoff functions as separate circuits in combination with, but external to said translinear amplifier. The principal concept of said two separate circuits for said signal cutoff functions is shown in **Fig. 10a**, with the two signal cut-off circuits **CutOffC-Lo** and **CutOffC-Hi** added to said (main) circuit to control the switching operation **Switch-Ctrl** of **Fig. 5**. These three circuits then operate together (possibly similar in function to a dotted-OR connection of said three circuits) to provide a combined control signal **Csw** for said switching device **SW**; Each cut-off circuit can thus override the output of the normal **Switch-Ctrl** circuit, once the switching device **SW** leaves the desired steady ramp-up/ramp-down area. Appropriate threshold elements will define the limits **CutOff Lo** and **CutOff Hi** of the steady ramp-up/ramp-down area, as shown in **Fig. 7b** and as explained above. Said possible threshold elements then provide the two control signals to either force said fully on or fully off state are **CtlCutOff Lo** and **CtlCutOff Hi**.

In addition, to explain the three circuits, the "a translinear amplifier", the "a circuit to drive said switching device to a fully on status" and the "a circuit to drive said switching device to a fully off status", quotations of the subject descriptions from the reference patent application No. 10/676919 are included into the instant paper.

Consequently, the same amendments and their remarks apply to claims 44 and 45.

4. Regarding claims 20 and 21, a Word program's formatting error, causing the erroneous numbering "claim 1817" and "claim 1917" is now corrected.

Thorough care is taken to not include by accident any new matter.

Reconsideration of the above rejection (or objection) is therefore respectfully requested.

All claims are now believed to be in condition for allowance, and allowance is so requested.

It is requested that should there be any problems with this Amendment, please call the undersigned Attorney at (845) 452-5863.

Respectfully submitted,

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